

WHAT IS CLAIMED IS:

1. A network synchronization system comprising:

an NTP (Network Time Protocol) server for providing time synchronization to a plurality of node units in the network,

5 the NTP server providing time synchronization to the node units in the network by using a synchronous mobile terminal as a reference clock, the synchronous mobile terminal being present in the network area and having a wireless interface.

10 2. The network synchronization system as claimed in claim 1, wherein the network includes an Intranet.

3. The network synchronization system as claimed in claim 1, wherein the wireless interface includes a Bluetooth interface.

15 4. The network synchronization system as claimed in claim 1, wherein the synchronous mobile terminal includes an IS-95/2000 mobile terminal.

20 5. The network synchronization system as claimed in claim 1, wherein the NTP server includes an NTP stratum-1 server.

6. The network synchronization system as claimed in claim 1, wherein the NTP server comprises:

an NTP processor for providing time synchronization to the plural node

units requesting time synchronization; and

a virtual clock manager being in communication with the mobile terminal through the wireless interface and managing the mobile terminal as a virtual reference clock.

5

7. The network synchronization system as claimed in claim 6, wherein the virtual clock manager comprises:

an NTP message processor for analyzing an NTP packet request message received from the NTP processor, reformatting time information acquired from the mobile terminal into an NTP packet format, and sending the NTP packet format as a response message to an NTP packet processor;

a clock manager for managing mobile terminals being present in the network area and operated as the reference clock of the NTP server; and

an interface including a wireless network protocol, and communicating with the mobile terminal.

15
8. The network synchronization system as claimed in claim 7, wherein the clock manager manages the mobile terminals hierarchically using previously input information of each mobile terminal, the information including a unit number, authentication information, or priority as a clock reference source, and

20
upon the NTP server receiving a time information request, the clock manager acquiring the time information from an uppermost mobile terminal in response to the request.

9. The network synchronization system as claimed in claim 8, wherein the clock manager monitors whether a mobile terminal previously registered using the wireless network protocol is out of the network area or is unable to communicate, and monitors whether a new mobile terminal enters the network area,

wherein when the registered mobile terminal is unable to communicate the clock manager disconnects the mobile terminal, and when a new mobile terminal enters the network area it is registered by the clock manager, and

wherein the clock manager periodically checks the node units in the network, and if a registered mobile terminal of a first priority is unable to communicate, the priority of the mobile terminal is changed to a lowest priority and a mobile station of a second priority is made to have the first priority.

10. A network synchronization method, which is for synchronizing a network that includes an NTP server using a synchronous mobile terminal as an external reference clock, the network synchronization method comprising:

(a) the synchronous mobile terminal with a wireless interface getting a connection to the network;

(b) the NTP server registering the network-connected synchronous mobile terminal as a virtual reference clock;

(c) the NTP server receiving a time synchronization request message from a plurality of node units in the network; and

(d) the NTP server setting the registered mobile terminal as the virtual reference clock and acquiring time synchronization of the node units requesting

time synchronization.

11. The network synchronization method as claimed in claim 10,

5 wherein (b) comprises:

registering the mobile terminals hierarchically using previously input information of each mobile terminal, the information including a unit number, authentication information, or priority as a clock reference source,

(d) further comprising:

10 acquiring time information from an uppermost mobile terminal, and responding to it, upon the NTP server receiving a time information request.

12. The network synchronization method as claimed in claim 11,

wherein (b) further comprises:

15 monitoring whether a mobile terminal previously registered using a protocol of the wireless network is out of the network area or is unable to communicate;

monitoring whether a new mobile terminal enters the network area;

20 disconnecting the mobile terminal when the registered mobile terminal is unable to communicate, and registering the newly-entered mobile terminal to a reference clock layer, after the monitoring; and

periodically checking the units in the network, and if a registered mobile terminal of a first priority is unable to communicate, changing the priority of the mobile terminal to a lowest priority and making a mobile station of a second

priority have the first priority.

13. The network synchronization method as claimed in claim 11, wherein (d) further comprises:

5 the virtual clock manager analyzing an NTP packet request message received from the NTP processor; and

reformatting the time information acquired from the mobile terminal into an NTP packet format, and sending the NTP packet format as a response message to an NTP packet processor.

10

14. An NTP server, which synchronizes a plurality of node units in a network using a synchronous mobile terminal with a wireless interface as a reference clock, the NTP server comprising:

15 an NTP processor for providing time synchronization to the plural node units requesting time synchronization; and

a virtual clock manager being in communication with the mobile terminal through the wireless interface and managing the mobile terminal as a virtual reference clock.

20

15. The NTP server as claimed in claim 14, wherein the wireless interface includes a Bluetooth interface.

16. The NTP server as claimed in claim 14, wherein the NTP server includes an NTP stratum-1 server.

17. The NTP server as claimed in claim 14, wherein the virtual clock manager comprises:

an NTP message processor for analyzing an NTP packet request message received from the NTP processor, reformatting time information acquired from the mobile terminal into an NTP packet format, and sending the NTP packet format as a response message to an NTP packet processor;

a clock manager for managing mobile terminals being present in the network area and operated as the reference clock of the NTP server; and

an interface including a wireless network protocol and being in charge of communication with the mobile terminal.

18. The NTP server as claimed in claim 17, wherein the clock manager manages the mobile terminals hierarchically using previously input information of each mobile terminal, the information including a unit number, authentication information, or priority as a clock reference source, and

upon the NTP server receiving a time information request, the clock manager acquiring the time information from an uppermost mobile terminal in response to the request.

19. The NTP server as claimed in claim 18, wherein the clock manager monitors whether a mobile terminal previously registered using the wireless network protocol is out of the network area or unable to communicate, and monitors whether a new mobile terminal enters the network area,

wherein when the registered mobile terminal is unable to communicate the clock manager disconnects the mobile terminal, and when a new mobile terminal enters the network area it is registered by the clock manager, and

5 wherein the clock manager periodically checks the node units in the network, and if a registered mobile terminal of a first priority is unable to communicate it changes the priority of the mobile terminal to a lowest priority and makes a mobile station of a second priority have the first priority.